
A New Species of *Anthurium* (Araceae) from Southern Ecuador and a Revision of the *Anthurium oxybelium* Schott Complex

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ABSTRACT. *Anthurium obpyriforme* from Loja province in southern Ecuador is described as new. This species has been confused with *A. oxybelium* Schott but shows considerable morphological and ecological differences. *Anthurium oxybelium* is introduced as the oldest name of a widespread upland species, and its relevant synonymy is included. A key is provided to distinguish *Anthurium obpyriforme* from the latter and other related high-altitude species of *Anthurium* sect. *Belolonchium* in Ecuador.

Key words: Andes, *Anthurium*, Araceae, Ecuador.

The exclusively Neotropical *Anthurium*, with approximately 1000 species, is the largest genus in Araceae (Croat, 1999b). At least 227 named species of *Anthurium* are known from Ecuador (Croat, 1999a), and many Andean species remain undescribed, especially those with large cordate leaves (Croat, 1999b). High-altitude Andean habitats are well collected and have relatively few *Anthurium* species compared to forests at lower elevations. Nevertheless, during fieldwork in the Cajanuma area in the Podocarpus National Park in southern Ecuador, it was recognized that besides *Anthurium oxybelium*, which is the dominant *Anthurium* above 2500 m, another species was exceedingly abundant at this altitude. Older collections showed that this new species had formerly been misidentified and confused with the widespread *A. oxybelium*. However, there were no difficulties in discriminating between the two species in the field, and field observations on more than 1000 individuals of both species and subsequent herbarium studies left no doubt that the material represents a separate species.

Like *Anthurium oxybelium*, many other high Andean species of *Anthurium* are widely distributed. Due to the large amount of variability in any spe-

cies of Araceae in these montane habitats, some of them have been described several times, especially those from mesic upland sites that were the most readily available habitats to the early collectors (e.g., André, Holton, Lehmann, Purdie). In this manner *A. oxybelium* has proven to have many synonyms, most of which were published by Louis Sodi-ro, who worked in Ecuador around the turn of the last century. *Anthurium oxybelium* is the oldest name in this complex, and it is related to *Anthurium obpyriforme*, the newly described species. Owing to this relatedness, the taxonomic complexity of this common widespread species, the inadequacy of the original description, the marked change in its status, and the extensive new synonymy, *A. oxybelium* is redescribed later in this paper.

Anthurium obpyriforme Leimbeck, sp. nov.

TYPE: Ecuador. Loja: Podocarpus National Park, along trail from Cajanuma Visitors Center to Mirador, wet montane forest, 04°05'S, 79°10'W, 2750–3000 m, 29 Oct. 2000, R. Leimbeck, J. Madsen & B. Windeballe 319 (holotype, AAU; isotypes, LOJA, MO-5309365-67, QCNA). Figure 1.

Planta epiphytica; internodia brevia, 1.5–3 cm crassa; caudex ad 5–30 cm longus; cataphylla mox in fibras resoluta, 9–17 cm longa; petiolus 25–96 cm longus, 4–9 mm crassus cum geniculo 1.5–2.5 cm longo; lamina obpyriforma, basi cordata, coriacea, 25–77 cm longa, 17–46 cm lata; pedunculus quam petiolus duplo brevior, 14–43 cm longus, 2–5 mm crassus; spatha erecta, lanceolata vel ovata, subviridis vel albida; spadix stipite 5–8 mm longo suffultus, 7–22 cm longus, 6–14 cm crassus, viridi-griseus vel rubineus.

Epiphytic, rarely terrestrial; internodes short, 1.5–3 cm diam.; stem short, generally 5–30(–85) cm long; cataphylls 9–17 cm long, drying light brown to red-brown, usually weathering to a dense mass of light yellow fibers; leaves erect-spreading;

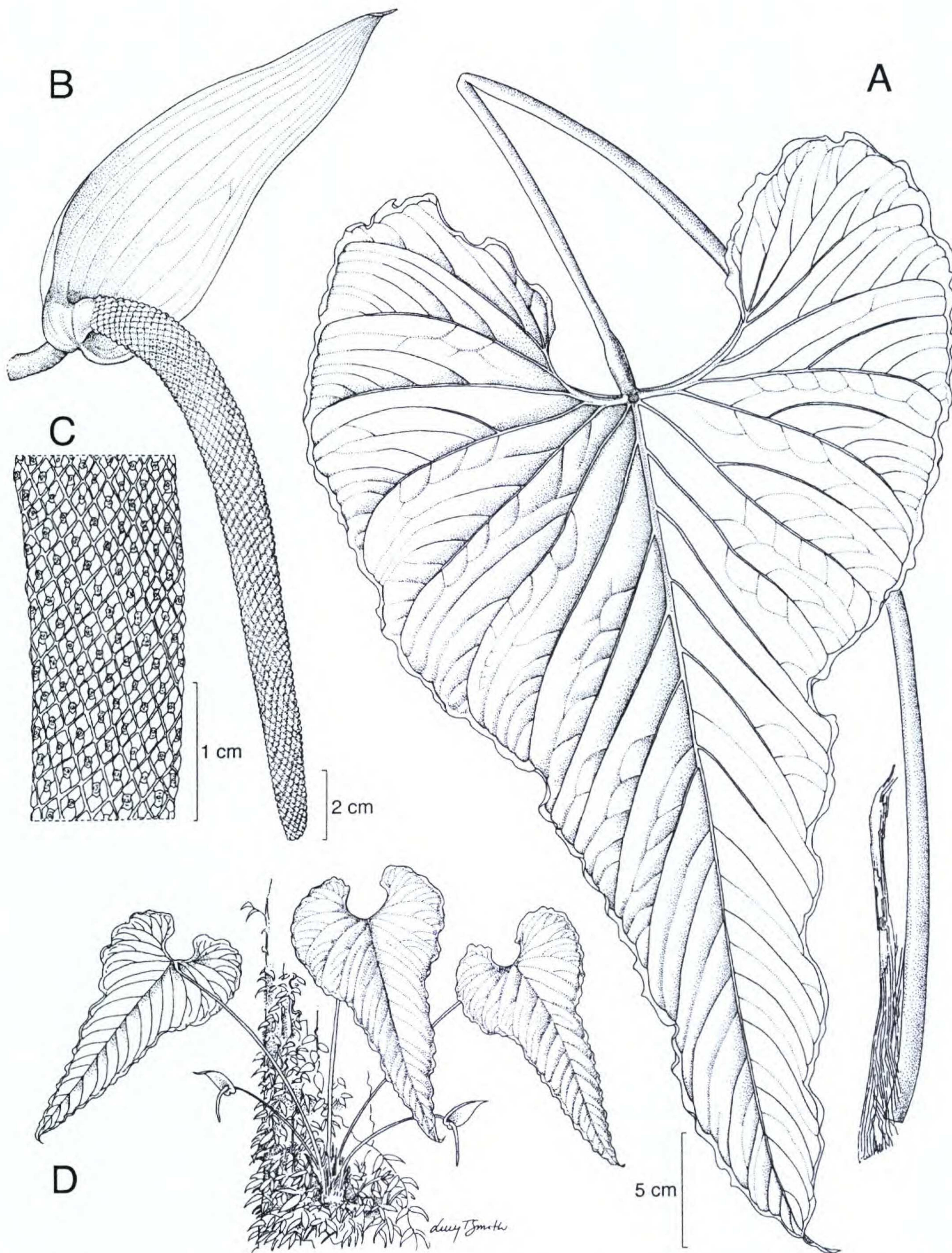


Figure 1. *Anthurium obpyriforme* Leimbeck. —A. Leaf with cataphyll enclosing the petiole base. —B. Spathe and spadix. —C. Spadix details. —D. Habit. (A from Leimbeck & Windeballe 339; B, C from the holotype, Leimbeck, Madsen & Windeballe 319.)

petioles 25–96 cm long, 4–9 mm diam., rigid, terete, esulcate to obtusely sulcate adaxially, matte, light green, drying brown to red-brown; sheath to 5 cm long; geniculum 1.5–2.5 cm long, slightly thick-

er than petiole, often red; blade obpyriform, deeply cordate at base, acute to acuminate at apex, (16–) 25–77 cm long, (6–) 17–46 cm wide, ca. 1.6 times longer than wide, broadest at petiole insertion, co-

riaceous, matte to semiglossy on both surfaces, epunctate, deep green on upper surface, paler below, drying green to grayish green, margin undulate; anterior lobe constricted at middle of blade, with concave lateral margins, ca. 3 times longer than posterior lobes; posterior lobes curved inward; midrib convexly raised above, \pm sharply V-shaped below, light green, drying brown; primary lateral veins 8 to 13 per side, departing midrib at 35–45° angle, usually only lowermost primary lateral veins prominent and raised in valleys (like a ridge rising up longitudinally in the center of a groove) on upper surface, the remainder sunken above, all primary lateral veins narrowly raised on lower surface, moderately straight or weakly curved to the margin, light green, usually drying brown; interprimary veins usually present, sometimes only near apex; secondary veins sunken above, raised below, lesser veins distinct in dry condition; collective vein usually arising from the first basal vein, higher order basal veins also collecting, but ultimately merging with the margin, 1–3 mm from margin, sunken above, raised below; basal veins 6 to 10 per side, the first pair usually free to base, the 5th and higher order basal veins coalesced to 5–9 cm, convexly raised above, moderately acute below, light green; posterior rib naked for most of its length along the sinus, to 6 mm wide, \pm flat, light green, at petiole insertion often red; sinus parabolic to hippocrepiform with rounded to truncate apex; inflorescence erect-spreading; peduncle 14–43 cm long, ca. half as long as petiole, 2–5 mm diam., slender, terete, matte, light green; spathe erect, directed at ca. 180° angle with the peduncle, 6–22 cm long, 1.5–8.5 cm wide, lanceolate to ovate, sometimes naviculiform, coriaceous, light green to white at anthesis, pluri-nerved, \pm acuminate at apex, cordate at base, inserted at ca. 45° angle on peduncle; stipe stout with small bulge at base and apex, 5–8(–15) mm long, same color as spathe; spadix spreading to arcuate-pendent, curved at ca. 90° angle to peduncle, rigid, tapered, 7–22 cm long, 6–14 mm diam., green-gray, turning dark ruby; flowers rhombic, 2.5–3.3 mm long, 2.2–2.5 mm wide (dry), 5 to 10 flowers in principal spiral, 6 to 15 flowers in alternate spiral; stamens yellow-white, exerted ca. 1 mm above tepals when dry; pollen yellow-white. Infructescence not seen.

Anthurium obpyriforme is so far known only from the western slopes of the Nudo de Sabanilla in Loja province, at an altitude of 2700–3050 m, which is near the tree line. The habitat is covered by upper montane rain forest with ca. 3000 mm precipitation per year, an annual mean temperature of 11°C, and

an exceptionally high tree species richness (Madsen & Øllgaard, 1994) and epiphyte richness (Bøgh, 1992). Due to low canopy height (\pm 10 m) and frequent treefalls the forest is quite open locally. However, dense bamboo thickets of *Chusquea* sometimes form an almost impenetrable lower understory. The dominant tree species is *Weinmannia glabra* L. f. (Cunoniaceae), and the majority of trees belong to Melastomataceae (Madsen & Øllgaard, 1994). *Anthurium obpyriforme* grows mostly epiphytically on the lower parts of the phorophyte, 0–3 m above the ground. Among all encountered individuals, only 14% were terrestrial, but most of the terrestrial individuals were small and none of them were fertile. With more than 750 individuals/ha *A. obpyriforme* is very common, and after *A. oxybelium* it is the second most abundant *Anthurium* in the area. Only three other Araceae species occur in the same habitat: *A. nigrescens* Engler, *A. longegeniculatum* Engler, and a third, yet undetermined *Anthurium*.

Anthurium obpyriforme has been confused with *A. oxybelium*. Both species belong to *Anthurium* sect. *Belolonchium* Schott emend. Engler, which is characterized by coriaceous, cordate leaves with conspicuous minor veins and cataphylls that usually weather into a mass of fibers (Croat & Sheffer, 1983). However, *A. obpyriforme* differs in being epiphytic with short internodes, while *A. oxybelium* is primarily a scandent terrestrial with longer internodes. Furthermore, *A. obpyriforme* has generally larger leaf blades (25–77 cm long vs. rarely longer than 30 cm) with strongly constricted anterior lobes (vs. anterior lobes with \pm straight margins), esulcate to obtusely sulcate petioles (vs. sharply sulcate), cataphylls always weathering into fibers (vs. cataphylls at upper nodes remaining \pm intact), shorter peduncles (half as long as petioles vs. about equal), and a shorter stipe (5–8 mm vs. 10–30 mm long).

Anthurium obpyriforme is also similar to “*A. melampyi* Croat ined.,” a yet unpublished species from Colombia and Carchí province in northern Ecuador. That species differs in having long, ribbed petioles (100–140 cm long), large blades that often are more than 1 m long, many primary lateral veins (25 to 30 per side), and the collective vein arising near the base, from one of the lowermost basal veins.

Several other related cordate-leaved *Anthurium* occur at high elevations in the Ecuadorian Andes, most of which were placed in section *Belolonchium* by Engler (1905). However, the section is poorly defined and may represent an assemblage of species that could not be assigned to any of the other

sections with cordate leaves (Croat & Sheffer, 1983). Species of *Anthurium* sect. *Belolonchium* sensu Engler (1905) occurring above 2500 m (Croat, 1999a) are presented in a key at the end of this paper, to distinguish them from *Anthurium obpyrifforme*. The key is based on herbarium material at AAU and species descriptions in Engler (1905), Sodiro (1903b), and Croat and Rodríguez de Salvador (1995).

Paratypes. ECUADOR. **Loja:** Podocarpus National Park, 1-ha sample plot N of Cajanuma Visitors Center, wet montane forest, 04°05'S, 79°10'W, 2800 m, 1 Nov. 2000, R. Leimbeck & B. Windeballe 325 (AAU, LOJA, QCNA), 4 Nov. 2000, R. Leimbeck & B. Windeballe 339 (AAU); E of Nudo de Cajanuma, N of Centro de Información, 04°05'S, 79°10'W, 2900 m, 20 Sep. 1989, A. Bøgh 47838 (AAU, MO), A. Bøgh 47840 (AAU), 26 Oct. 1988, J. Madsen 75508 (AAU); above Cajanuma, trail from Centro de Información towards Lagunas de Compadre, just below forest limit, wet montane forest, 04°05'S, 79°10'W, 2900–3050 m, 16 Jan. 1989, J. Madsen 85523 (AAU).

Anthurium oxybelium Schott, Oesterr. Bot. Wochenbl. 7(39): 310. 1857. TYPE: Colombia. Nueva Granada: Río Hacha, exact location unknown, *Purdie s.n.* (holotype, K).

Anthurium lividispica Sodiro, Anales Univ. Centr. Ecuador 15(108): 14. 1901. Syn. nov. TYPE: Ecuador. Pichincha: El Corazón, 2800 m, Mar. 1900, *Sodiro s.n.* (specimen lost). Ecuador. Cotopaxi: El Corazón, Jan. 1901. *Sodiro s.n.* (holoneotype, designated here, G; isoneotype, QPLS).

Anthurium luteolum Sodiro, Anales Univ. Centr. Ecuador 15(108): 13. 1901. Syn. nov. TYPE: Ecuador. Pichincha: Oyacachi, ca. 2800 m, *Sodiro s.n.* (holotype, Q).

Anthurium patulum Sodiro, Anales Univ. Centr. Ecuador 15(108): 14. 1901. Syn. nov. TYPE: Ecuador. Napo: Oyacachi, Jan. 1900, *Sodiro s.n.* (holotype, B; isotypes, G, QPLS).

Anthurium psilurum Sodiro, Anales Univ. Centr. Ecuador 15(108): 14. 1901. Syn. nov. TYPE: Ecuador. Pichincha: Oyacachi, ca. 2800 m, *Sodiro s.n.* (holotype, B; isotypes, G, QPLS).

Anthurium puelanum Sodiro, Anales Univ. Centr. Ecuador 15(108): 17. 1901. Syn. nov. TYPE: Ecuador. Chimborazo: Volcán Tungurahua, Puela, *Sodiro s.n.* (holotype, B; isotype, G).

Anthurium sclerophyllum Sodiro, Anales Univ. Centr. Ecuador 15(108): 14. 1901. Syn. nov. TYPE: Ecuador. Napo: Papallacta–Cuyujua, Feb. 1901, *Sodiro s.n.* (holotype, QPLS; isotypes, G, Q).

Anthurium stans Sodiro, Anales Univ. Centr. Ecuador 15(108): 17. 1901. Syn. nov. TYPE: Ecuador. Pichincha: Volcán Pasochoa, 3000–4200 m, *Sodiro s.n.* (holotype, B).

Anthurium albaretii J. F. Macbride, Candollea 5: 348. 1934. Syn. nov. TYPE: Ecuador. Pichincha: Volcán Pasochoa, *Sodiro s.n.* [28] (holotype, B).

Terrestrial or sometimes epiphytic, 0.3–1(–1.5) m tall; internodes mostly 4–6 cm long, 1.5–2 cm diam., except much shorter, usually about 1 cm long near apex, sometimes much longer on older stems, to 16 cm long; cataphylls 8–13 cm long, persisting red-brown, intact to semi-intact toward apex, becoming red-fibrous, eventually deciduous at lower nodes; petioles subterete, sharply sulcate, 19–64 cm long, 4–5 mm diam., often red near apex; blades narrowly ovate to triangular or weakly panduriform, (12–)20–30 cm long, (4–)10–26 cm wide, (1.3–)2.3–4 times longer than wide, usually deeply cordate at base, moderately coriaceous, semiglossy, slightly bicolorous, usually drying red-brown on both surfaces, sometimes gray-green; posterior lobes (2–)4.5–15(–20) cm long, 2.7–8(–13) cm wide, directed toward the base or slightly outward, sometimes markedly curved inward and overlapping; margins of the anterior lobes convex to straight or concave; midrib \pm concolorous, narrowly raised in valley above, convex and paler below; primary lateral veins (5)8 to 11 pairs, etched-sunken above, convex below, spreading at 50–75° angle; tertiary veins etched above, slightly darker than lower surface; collective veins arising from 3rd basal veins, sometimes from the first basal veins, 3–4 mm from margin; basal veins (3)4 to 9 pairs, the 1st and sometimes 2nd free to the base, the 3rd and 4th coalesced to (0.5–)2–4 cm; posterior rib naked for 1–3.5 cm along the sinus; sinus oblong to closed to hippocrepiform, rarely parabolic; inflorescence erect to erect-spreading, held at about the level of the leaves; peduncle 10–50 cm long; spathe usually held horizontally and hooding spadix, 6–16 cm long, 1–3.5 cm wide, green, sometimes tinged with red to greenish purple, rarely reddish or red, long-acuminate to acicular (the acicular portion to 1.5 cm long); stipe 1–3 cm long; spadix (4–)8–17 cm long, 7–15 mm diam., (5.7–)9–17 times longer than wide, often curved downward, green, olive-green, greenish purple, dark purple, purplish green, greenish brown, brown in age; pistils early; tepals 3.5–4 mm long (diameter in longitudinal direction); stamens are exerted at anthesis.

Anthurium oxybelium ranges from Colombia (and probably Venezuela) to Ecuador (Sucumbios, Napo, Morona–Santiago, Zamora–Chinchipe, Carchi, Imbabura, Pichincha, Cotopaxi, Tungurahua, Cañar, Azuay, Loja) and Peru (Amazonas, Cajamarca, Pasco, Cuzco) at 1400–4300 m elevation. It is highly variable, even within a single population, as is in-

indicated by the fact that Sodiro described so many species from a single locality at Oyacachi. Despite high variability, these plants share certain things in common. Typically the internodes are longer than broad, though larger or older plants appear to have thicker stems with shorter internodes. Most cataphylls are persistent, and at least the upper ones are usually intact, but they are mainly fibrous at the base. Petioles are subterete and obtusely and narrowly sulcate. The moderately coriaceous blades vary greatly in shape, being primarily narrowly triangular to narrowly ovate with a usually obovate or rarely hippocrepiform sinus and an acuminate apex. The margins of the anterior lobe are variable, most commonly straight or broadly convex, though sometimes concave. Basal vein numbers are mostly 4 to 6 per side, the first or sometimes the second pair is free to the base, and several of the remainder are coalesced to 4 cm. The posterior rib is naked along much of its length. The inflorescences are long-pedunculate, and while the peduncles average about as long as the petioles, they may be shorter, as long as, or longer than the petioles. Spathes are variable, usually lanceolate to narrowly elliptic, sometimes elliptic, usually green or green tinged with purple, sometimes purple with green veins. The spadix is usually green, but sometimes purple or red tinged, typically short and weakly tapered to the apex, generally about as long as the spathe or shorter. The spadix is commonly 10–17 times longer than wide, but on the stubbier forms it may range up to little more than 5 times longer than wide. Flowers are large for the genus, usually 3.5–4 mm diam. with the stamens exerted at anthesis.

For many years this species has been called *Anthurium pulchrum* Engler, an illegitimate name since that name was already published by N. E. Brown for another species. That illegitimate name was published by Engler (1898: 449) based on a Sodiro (*Sodiro s.n.* [28]) collection from Volcán Pasochoa in Pichincha province. Synonymized here under *A. oxybelium*, *A. albareti* was intended as a new name for *A. pulchrum* by Macbride (1934).

As is the case of many Sodiro collections, no specimens for *A. luteolum* were listed in the original description, which consisted only of a key. His first mention of any collection is in his first 1903 publication (Sodiro, 1903a: 281), where he stated that *A. luteolum* was collected between Papallacta and Cuyujua. Only a single collection exists with

this information, a collection at the Universidad Central in Quito (Q).

A neotype was necessary for *A. lividispica* Sodiro because no specimens exist from El Corazón dated March 1900, as was listed by Sodiro. Instead, a collection from the same locality but collected in January 1901 has been designated here as the neotype.

Anthurium macrourum was treated as a synonym of *A. patulum* (now *A. oxybelium*) in the *Catalogue of the Vascular Plants of Ecuador* (Croat, 1999a), but owing to the lack of a type it appears best to continue to assume that the species is distinct. Most existing material of that species, which was determined by Sodiro, have spadices longer and proportionately more slender than those of *A. oxybelium*.

Most of the taxa synonymized in this treatment were described from a few areas in Ecuador, all very similar in life zone characteristics. Many species were described from a narrow region on the eastern flanks of the Andes east of Quito, between Papallacta, Cuyujua, and Oyacachi in Pichincha province, along the road between Quito and Baeza. The remaining species were described from Volcán Pasochoa or at Puela on Volcán Tungurahua. Considering the variability in this species complex, none of the types listed above represent anything out of the ordinary. Sodiro separated *A. luteolum* by its having a yellow, rather than green spathe as in *A. oxybelium*. *Anthurium oxybelium* is apparently further distinguished in having the blades sagittate-hastate and somewhat constricted above the petiole attachment.

Anthurium lividispica and *A. psilurum* are distinguished by having the posterior lobes retrorse with an ovate sinus. Furthermore, *A. lividispica* has convex anterior lobes and a thick spadix, 1.3 times as long as the spathe (vs. straight blade margins and a slender spadix, twice as long as the spathe in *A. psilurum*). All the characters used by Sodiro are either variable ones or characters that change with age, so that all the material easily fits into the complex as it is known today. Throughout its range and even on a local populational level, *A. oxybelium* is one of the most variable species in the genus. Species like *A. oxybelium*, *A. dombeyanum* Brongniart, and *A. nigrescens* that range throughout much of the Andes at high elevations occur in relatively isolated populations on the tops of mountains, which may account for the high variability from population to population.

KEY TO HIGH ANDEAN SPECIES OF *ANTHURIUM* SECT. *BELOLONCHIUM* (SENSU ENGLER, 1905) FROM ECUADOR

- 1a. Peduncle clearly shorter than petiole; internodes short, rarely 3 cm long.
 - 2a. Flowering spadix sessile or short-stipitate (stipe 0–3 mm long); petioles to 173 cm long.
 - 3a. Epiphyte; petioles many-ribbed; leaf blades prominently constricted above base; spathe white to light green (northern Ecuador) *A. jimena* Croat
 - 3b. Terrestrial; petioles sulcate; leaf blades ovate-cordate, not constricted above base; spathe red-tinged, naviculiform (Colombia, Ecuador) *A. cupulispalum* Croat & Rodriguez
 - 2b. Flowering spadix long-stipitate (stipe 5–20 mm long); petioles to 100 cm long.
 - 4a. Spathe broadly ovate, enclosing the spadix at base, but narrowly open at front; internodes 7–8 cm diam.; geniculum 5–7 cm long; leaves 45–90 cm wide (northern Ecuador) *A. gualeanum* Engler
 - 4b. Spathe lanceolate to ovate, not enclosing the spadix; internodes to 3 cm diam.; geniculum to 3 cm long; leaves less than 50 cm wide.
 - 5a. Cataphylls usually less than 9 cm long; leaves subelliptic to oblong-sagittate, less than 15 cm wide; spathe purple on both sides with green-yellow linear nerves, longer than spadix (eastern Andean slopes, Ecuador and Peru) *A. variegatum* Sodiro
 - 5b. Cataphylls more than 9 cm long; leaves ovate to obpyriform, more than 17 cm wide; spathe solid green, purple, roseate or white, not purple with green-yellow nerves; shorter than spadix.
 - 6a. Cataphylls 25–30 cm long; petioles muriculate; leaf blades 60–120 cm long; major veins with scaly, wing-like appendages on lower surface; spathe purple; stipe 15–20 mm long (Ecuador) *A. scabrinerve* Sodiro
 - 6b. Cataphylls 9–20 cm long; petioles glabrous; leaf blades 40–77 cm long; veins without appendages; spathe green to white or roseate; stipe less than 15 mm long.
 - 7a. Leaves obpyriform, constricted above base, coriaceous; stipe ca. 5–8 mm long with basal and apical bulge; spathe light green to white (southern Ecuador) *A. obpyriforme* Leimbeck
 - 7b. Leaves ovate, subcoriaceous; stipe 12–15 mm long without bulge; spathe roseate (Colombia to Bolivia) *A. incurvatum* Engler
 - 1b. Peduncle about equal to or longer than petiole; internodes more than 2 cm long.
 - 8a. Leaf blades 40–70 cm long, 20–35 cm wide; spadix 12–50 cm long.
 - 9a. Stipe 15–30 mm long; petioles plurisulcate; lamina thick, anterior lobe ca. 3 times as long as posterior lobes; spathe wide lanceolate, ca. 11 cm long, 3.5 cm wide (Ecuador) *A. rigidifolium* Engler
 - 9b. Stipe 5–10 mm long; petioles unisulcate; lamina herbaceous to cartilaginous, anterior lobe ca. 4 times as long as posterior lobes; spathe linear to lanceolate, 15–23 cm long, 1–3.5 cm wide.
 - 10a. Lamina cartilaginous; spathe linear, 1–1.5 cm wide, purple; spadix 18–20 cm long (northern Ecuador) *A. tremulum* Sodiro
 - 10b. Lamina herbaceous; spathe lanceolate, 1.5–3.5 cm wide, green-yellow; spadix 25–50 cm long (northeastern Andean slope, only known from the type) *A. vomeriforme* Sodiro
 - 8b. Leaf blades 12–35 cm long, 8–26 cm wide; spadix 4–17 cm long.
 - 11a. Peduncle and petioles usually more than 25 cm long; cataphylls 8–13 cm long (Colombia to Peru) *A. oxybelium* Schott
 - 11b. Peduncle and petioles usually less than 25 cm long; cataphylls less than 8 cm long.
 - 12a. Lamina triangular-sagittate, 12–14 cm long, 8–10 cm wide, anterior lobe ca. 4 times as long as posterior lobes, sinus between basal lobes arcuate to parabolic (southern Ecuador, only known from the type) *A. coerulescens* Engler
 - 12b. Lamina ovate-sagittate, ca. 25 cm long, 13–15 cm wide, anterior lobe 2–3 times as long as posterior lobes; sinus between basal lobes hippocrepiform (Venezuela to Bolivia) *A. nigrescens* Engler

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